# Abstract

Purpose

The recent influx of interest in and the changing status of drug checking has led us to reconsider some fundamental questions about drug checking. This commentary proceeds in three parts: (1) terminology, (2) definitions and (3) programmes that are excluded from the definition of drug checking that still have value for harm reduction.

Approach

To inform the commentary, an informal review of pertinent publications on the topic was conducted to extract relevant definitions and terminology.

Findings

DCS have 5 necessary features: (1) aim of reducing harm; (2) analyse samples directly from the public; (3) return results to the service user; (4) involve information exchange between service user and DCS; and (5) conduct a tailored intervention with the service user. Variable features include the populations served, setting, analysis methods, immediacy of results, nature of intervention, levels of engagement with other stakeholder groups, funding models, legal status and staff skillsets. Programmes that are not DCS but have some similarities to DCS include non-publicly accessible testing of drugs as well as testing of bodily fluids where results may inform drug alerts.

Originality/Value

Drug checking remains a legally, politically and commercially sensitive health service. Reflecting on the history and evolution of drug checking, both as a term and as a harm reduction service, helps provide clarity in terms of what drug checking is and what it is not. This facilitates more effective framing of evaluations, in terms of what DCS aim to do and achieve.

Keywords: Drug checking, harm reduction, definitions

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# Introduction

Drug checking (also known as pill testing or drug safety testing) services (or DCS) have been practiced as harm reduction interventions since the 1960s (Kealy and Webber, 1975, Marshman, 1974) and Dutch and Spanish services have been operating for 30+ years continuously (Barratt *et al.*, 2018b, Kriener *et al.*, 2001). In the last decade, there has been a renewed interest globally in drug checking services, prompted by increased risk of new psychoactive substances being mis-sold as better-established drugs (Measham, 2020b, Vidal-Giné, Fornís-Espinosa and Ventura-Vilamala, 2014), the increased strength of tablets and powders - especially for European MDMA (Mounteney *et al.*, 2018), and the rise of fentanyl type substances and the overdose crisis in North America (Suzuki and El-Haddad, 2017, Krausz, Westenberg and Ziafat, 2021). Since 2020, global upheaval caused by the COVID-19 pandemic has also led to drug market disruptions (Price *et al.*, 2022, European Monitoring Centre for Drugs and Drug Addiction, 2021, Pascoe *et al.*, 2022),­ making it more important than ever for people who use drugs to be able to identify and avoid misrepresented substances, and adjust their dosage if they encounter higher strength substances. In Europe, the EMCDDA recently began publishing data and analysis from drug checking services belonging to the Trans-European Drug Information (TEDI) network – indicating formal recognition and value of such information (European Monitoring Centre for Drugs and Drug Addiction, 2020), and in Canada, multiple new drug checking services have emerged with government funding (Wallace *et al.*, 2021, Borden *et al.*, 2022). The New Zealand government has recently passed legislation that makes it the first country in the world to create a legal licensing framework covering the whole operation of a drug checking service (New Zealand Government, 2021). In many parts of the world, drug checking is no longer a fringe or quasi-legal activity, and no longer run by volunteers with limited budgets.

The recent influx of interest in and the changing status of drug checking has led us to reconsider some fundamental questions about drug checking. We believe it is particularly important and timely to develop a clearer definition of drug checking to frame evaluations more effectively, compare outcomes across services and help manage the expectations of all stakeholders. This commentary proceeds in three parts: (1) the terminology of drug checking, (2) What is drug checking and what is it not? and (3) What is excluded from the definition of drug checking that could still have value for harm reduction and public health? To inform the commentary, an informal review of pertinent publications on the topic was conducted to extract relevant definitions and terminology. We note at the outset that we were unable to include non-English language publications in our commentary, which therefore limits its scope to include those services publishing in English.

# The terminology of drug checking

Over the 50+ years of various drug checking services operating around the world, a long list of terms have been used to describe these services, including:

* Street drug identification
* Drug safety testing
* Street drug analysis
* Pill testing
* Drug checking
* Drug testing
* Pill and powder testing
* Pill checking
* Adulterant screening
* Forensic testing
* Multi agency safety testing
* Point-of-care drug testing

The term ‘pill testing’ arose in the context of determining the content of pills sold as ‘ecstasy’, to see whether or not they contained the desired ingredient, MDMA. In this era (1990s-2000s) the testing technology typically available to individuals or services was colour reagent test kits, which can be unreliable especially when pills contain combinations of drugs. Presently, pills are only one of many forms of drugs present in recreational drug settings, so the term ‘pill testing’ does not accurately describe the testing of drugs in the current context, although the use of the term persists, particularly in Australia (Ritter, 2019). For example, in the UK festival context, ecstasy pills make up about one quarter of submissions to festival DCS (Measham and Simmons, Under review). Even in Australia where the term persists, MDMA is more commonly consumed in capsule form rather than tablet form (Sutherland *et al.*, 2021).

The term ‘drug checking’ arose from Europe, presumably referring to the ‘checking’ of what was in drug samples through the chemical analysis component of the intervention. The term ‘checking’ might imply that the drugs are being checked for adulterants or contaminants, or checked to see if they are ‘safe’, and this second interpretation is a concern for those who argue that these kinds of interventions might facilitate or encourage drug use. It was for this reason that the UK initially adopted the term ‘drug safety testing’ when the pilots were first muted with tentative stakeholders in the early 2010s, with both public health and police finding the term drug checking a block to progress. The term ‘drug safety testing’ worked well with UK stakeholders as it pertained to the idea keeping people safe, not making drugs safe. This sentiment aligned with more of a ‘health and safety’ imperative. However, as the service became more established and pilot DCS were designed to be legally compliant and were not simply ‘rubber stamping’ future drug use, the internationally recognised term ‘drug checking’ has became more acceptable to UK stakeholders in recent years.

Furthermore, in Australia, festival goers may think that ‘drug checking’ describes the searching that police conduct at the entry to festivals, where they ‘check’ for ‘drugs’, often accompanied by drug detection dogs. ‘Drug testing’ in the Australian context is a term that predominantly refers to the testing of bodily fluids like saliva or blood for the presence of drugs. Drug testing programmes are designed to operate as a deterrent to the use of drugs while driving a vehicle or working in specific occupations, or as a condition of probation or family court orders. Yet in some European countries, for example, The Netherlands, the term ‘drug testing’ is preferred and essentially refers to drug checking services (Brunt *et al.*, 2017). This may reflect a lack of punitive drug testing of bodily fluids for traces of drugs in these countries, unlike in Australia, the US and elsewhere.

It is clear from this tracing of just some of the terminology used that terminology choices evolve differently in different contexts, befitting the legal, historical and cultural contexts within which they operate. Given the complexity of implementing drug checking services and getting political support for them in many countries, the framing of the service (and therefore, its name) may differ substantially to suit the localised context.

# What is drug checking and what is it not?

A selection of recently published definitions of drug checking include:

“[Drug checking services] provide people who use drugs (PWUD) with information on the chemical composition of their drug samples to facilitate more informed decision-making.” (Maghsoudi *et al.*, 2022)

“Drug checking combines chemical analysis with health consultations, with the primary aim of reducing harmful drug use and primary characteristic of direct engagement with people who use drugs.” (Measham and Turnbull, 2021)

“Drug checking services invite members of the public to anonymously submit psychoactive drug samples for forensic analysis and then provide individualised feedback of results and counselling as appropriate” (Barratt *et al.*, 2018b)

Earlier definitions contained some slight variations. For example the older TEDI definition (Ventura *et al.*, 2013) specified specific types of drugs that would be analysed (e.g. synthetic drugs). Given the utility of drug checking in the current contexts with a broader range of substances of concern, including opioids and benzodiazepines (Laing *et al.*, 2021), this bracketing by drug type would be overly restrictive in the face of contemporary concerns:

“The term “Drug Checking” is referred to an integrated service that basically enables individual drug users to have their synthetic drugs (e.g., cocaine, ecstasy, GHB, or LSD) chemically analysed as well as receiving advice, and, if necessary, counselling.” (Ventura *et al.*, 2013)

The definition put forward by Spruit two decades ago describes the Dutch drug checking service. Inherent in this description are assumptions that the substance of concern was submitted for testing prior to consumption by the service user. More recent data indicate that a sizeable minority of drug checking service users have already consumed (in part) the substance they wish to test, in order to find out why they experienced negative effects rather than to prevent negative effects from future use (Measham, 2019).

“The basic concept for the organization is the exchange of information: a person who intends to consume an illicit drug delivers a sample of the drugs he or she has bought to the project, thus supplying the project with information about this drug on the market. In exchange the project has the drug analyzed in a lab and supplies the potential consumer with information about its real content matter (main compound and quantity).” (Spruit, 2001)

Papers published before 2000 referring to drug checking (or a similar service using a different term) were less likely to include a clear definition. Some exceptions included the following definitions of specific services operating in the US in the 1970s and 1980s. The importance of anonymity for the people submitting substances and the need to maintain credibility with that group was noted in these descriptions of earlier DCS:

“The purpose of the [Street Drug Identification] program was to analyze drugs submitted by random anonymous donors in order to study current street drug epidemiology; to keep local medical facilities such as emergency hospitals, drug abuse clinics, poison control centers, school nurses, and free clinics informed; and to develop continuing hard data for drug education programs. Initially, and again recently, the results of the analyses also were reported to the source of the drug without the source revealing its identity. This program was established deliberately in an academic setting, unrelated to any law enforcement group, so as to protect its credibility among the young and the drug subculture. Thus, we do not analyze samples submitted by law enforcement groups.” (Lundberg, Gupta and Montgomery, 1974)

“Participants in the program were adults who had purchased street drugs and who, under the auspices of the Street Drug Identification Program, brought the drugs in to be analyzed for their actual content. The participants were later given a listing of the actual drugs present in the samples, but not a quantification of the contents. “ (Klatt, Namiki and Noguchi, 1986)

To analyse these definitions, we will review (1) defining features, (2) variable features and (3) exclusions.

## Defining features

The TEDI network’s most recent definition includes the following defining features:

“To summarize, a drug checking service must:

* Have an explicit aim of reducing harm;
* Collect and analyse samples directly from the public;
* Return the analysis results to the service user directly;
* Involve an exchange of information between the service user and the drug checking service;
* Give information about risk to the service user directly, tailored to the specific analysis result and the information received from the service user.” (Trans European Drug Information (TEDI), 2022). (p. 3)

## Variable features

With these defining features fixed in the definition, a lot of variety still flourishes under services deemed to be drug checking services. These variable features include (Brunt, 2017, Measham, 2019):

* Populations served
  + Historically in Europe, drug checking services were designed primarily to meet the needs of people who used ‘party’ drugs, e.g. stimulants and psychedelics in recreational settings (Kriener *et al.*, 2001). The earliest incarnations of drug checking can be traced back to the mid 1960s where adulterated LSD was detected by services among young ‘hippies’ (Smith, 1974). The early street drug analysis programs served a variety of populations, in particular people who attended drug treatment and outreach services or through pharmacy outlets (Brown and Malone, 1973). In recent years, community-based drug checking services have emerged that are designed to serve more diverse and untargeted populations (Measham, 2020a), or to target structurally vulnerable populations (Borden *et al.*, 2022, Maghsoudi *et al.*, 2020), sometimes co-located with drug consumption rooms (Gosmer, 2018).
* Setting of service
  + Related to the variety of populations served is the service setting. Static facilities based in their own offices, or co-located with pharmacies, outreach facilities, or treatment services, provide services to a more diverse population group. In contrast, event-based mobile services work in (often multiday) festival environments, nightclubs and nightlife spaces where drug use rates are typically higher than the general populuation. See below for discussion of a third type of setting, the postal/remote model.
* Types of analytic testing conducted
  + Drug checking services utilise a variety of analytic methods depending on resourcing, setting of service, importance of short wait times for that population group, and importance of quantification (dosage information) as opposed to simply identifying relevant psychoactive components of the substance of concern submitted (Harper, Powell and Pijl, 2017). With reagent test kits being the least sophisticated and the cheapest tool, through to more portal laboratory methods like FTIR and HPLC, and on to more comprehensive and costly laboratory methods such as PS-MS, NMR and GC-MS, there is often a trade-off between speed, accuracy, mobility and cost. Services often employ a range of analytic tools rather than singular tools to improve reliability and validity, particularly if aiming to provide information on the strength as well as contents of submitted samples.
* Immediacy of test results (wait times)
  + Dependent upon the kind of analytic methods used, test results may be available almost immediately or a wait of minutes, hours or days may be required. Willingness to use services with longer wait times diminishes (Barratt *et al.*, 2018a), especially in settings where immediate drug use is anticipated (Reed *et al.*, 2021). However, at least among festival and nightlife populations, many people prefer to wait longer to obtain more comprehensive results, including quantification (Barratt *et al.*, 2018a).
* Nature of the intervention with service user
  + While the defining features stipulate that some kind of risk-reduction information exchange between service user and staff must be provided, tailored to their individual test result and circumstances, the nature of this intervention may differ between services. How much time is spent engaging in the intervention? Is there an intervention manual? How are staff trained to conduct this work? Who delivers the intervention? What are the potential legal restrictions around harm reduction advice for safer future drug use?
* Levels of support and engagement with other stakeholder groups
  + The types of stakeholder groups that are important will differ by the setting of the service. For example, event-based stakeholders may include event promoters, police, security, other support services (eg paramedics, welfare, harm reduction and psychedelic trip sitting). Community-based stakeholders may include the local council, public health, police, licensing, central business district groups, hospitals and other substance misuse services (Measham, 2020b). DCS can integrate with event-based stakeholders through dissemination of test results and insights on broader trends at regular on-site meetings, for example, whereas community-based DCS may be integrated with local drug treatment, outreach services and public health information systems.
* Who conducts the analysis and how?
  + DCS may partner with a fixed site laboratory and have analysis conducted by a different entity to the service itself, or they may conduct most of the chemical analysis but engage with laboratory partners for periodic verification or when unusual drug samples are encountered. DCS staff may analyse samples themselves, in mobile laboratories staffed by chemists, healthcare practitioners or general staff, or may subcontract some analyses to commercial fixed site laboratories.
* Who disseminates the test results and how?
  + Beyond the requirement for DCS to disseminate individual test results to individual service users, there is a large variety of additional dissemination strategies. Some services publish all or most test results online to advise the public on the current state of the local drugs market (e.g. Toronto and Vancouver Island services in Canada and Safer Party in Switzerland). Other services publish targeted information and alerts on-site and/or offsite during or after events (e.g. The Loop). All DCS may feed data into local, jurisdiction, nation-level and international drug monitoring or early warning systems.
* Funding models
  + DCS typically receive at least some government or public sector funding, but many also are mainly reliant on private and philanthropic donations, fees from promoters and service-user co-payments (Barratt *et al.*, 2018b). Many services are reliant on in-kind support from volunteers and auspicing organisations. Services fully funded by local or national government are, however, increasing, from the Netherlands and the UK in Europe to Vancouver in Canada.
* Legal status
  + The legal status of DCS is complex and varies between countries and localities. There are three main areas of potential legal jeopardy:
    - The first area is for service users submitting substances of concern (which may or may not be subsequently identified as controlled drugs) and the potential crimes of possession and supplying controlled drugs. This risk may be addressed by service users putting their sample on the equipment plate to avoid handling by staff and to avoid legal jeopardy for service users of ‘supplying’ to the DCS. The disadvantages of this process are that firstly, it excludes the possibility of sample preparation by experienced laboratory staff before analysis which may compromise the test result. Secondly, analysis techniques are confined to methods such as FTIR, Raman or reagent testing that do not require the handling of samples by laboratory staff, but also cannot generate fully comprehensive substance identification, nor quantification. Other services may direct service users to surrender samples into locked amnesty bins delivered to a mobile laboratory for similar reasons of breaking the supply chain between service user and staff. However the matter of possessing a controlled drug remains for service users and for this reason many DCS negotiate letters of comfort, Memoranda Of Understanding (MOUs) or tolerance zones around DCS to avoid risk of arrest, as happens with drug consumption rooms/overdose prevention sites and needle exchange services.
    - The second area of concern relates to the handling of substances of concern in the mobile lab. Although substances of concern submitted to DCS are of unknown content and a minority may be non psychoactive (eg. 7% of substances submitted to UK DCS in 2018, Measham and Simmons, under review), once confirmed as controlled drugs, the handling of them is prohibited in most parts of the world. A license to handle controlled drugs may be issued by the appropriate authorities to laboratory staff to cover this aspect of the DCS.
    - Thirdly, staff delivering consultations may be legally constrained regarding how they frame their harm reduction advice about controlled drugs, appropriate to legislation regarding assisting or abetting a future criminal offence by advising about future drug use.
  + These legal complexities have led to a number of responses by DCS. As noted above, the only country with an overall legal licensing framework to cover the whole of a DCS is the one currently being introduced in New Zealand (New Zealand Government, 2021). Elsewhere services use a combination of formal and informal agreements to operate, including licenses to handle controlled drugs, stakeholder MOUs and police letters of comfort. It is also noteworthy that police, lawyers and government within a jurisdiction do not necessarily agree with each other on the interpretation of the law in relation to DCS and not all DCS are equally legally compliant.

## Exclusions

The following related services are not drug checking services according to the TEDI 2022 definition, but some may still have value (see next section):

* Services that test substances of concern for police, medical facilities or other agencies who aren’t necessarily or primarily people who use drugs (PWUD)
* Services whose primary aim is not harm reduction (for example, surveillance for law enforcement or trend monitoring purposes)
* Monitoring services that do not return results to the individual service user, deliver individually tailored harm reduction consultations or have a direct exchange of information with the service user (e.g. amnesty bin testing, postal testing)
* Systems that analyse human biospecimens for the presence of drug metabolytes
* Services that analyse drug samples for evidential purposes, in order to pursue prosecutions for drug-related offences – these can undermine trust in the service by target groups (see TEDI, 2022)

A further question for debate related to exclusions pertains to the standards of technology used in analysis of the drug samples. If a service only utilises colour reagent test kits or fentanyl test strips and no other technologies, is this information enough to provide an accurate, reliable and comprehensive result back to the service user? The question of whether results from some technologies may be ‘worse than nothing’ has continued over decades of discussions regarding the value of drug checking, with many commentators agreeing that reagent testing alone is too restrictive in scope and potentially unreliable in operation to deliver robust enough results to utilise. Nevertheless, a testing service using only reagents or only fentanyl test strips may still provide pertinent and actionable information to clients, despite the paucity of information (Barratt, Bright and Blackwell, Under review).

## How is the definition changing in response to global shifts?

The arrival of COVID-19 in 2020 and the social and mobility restrictions utilised by governments to control the spread of the virus created a situation where in-person services were forced to develop new ways of engaging their clients. For example, the pandemic resulted in the development of a web outreach service for PWUD in Russia through the use of Telegram, a popular messaging app (Davitadze *et al.*, 2020).

Postal services, assuming they feedback the results only and do not engage in an intervention with the service user, are excluded from TEDI’s 2022 definition of a drug checking service. If it is only the result that is provided and no tailored intervention and advice, there is also no way of knowing what the service user changes about their behaviour, if anything, following the provision of information, and it becomes difficult to measure changes in outcomes for the users of these services. We do not mean to suggest that people who use drugs would not change their behaviour, simply that it is much harder if not impossible to gather that information without further interaction and engagement with the service user. It should also be noted that postal testing services are utilised by potentially unknown numbers of police and parents for intelligence and surveillance purposes, with minimal likelihood of harm reduction outcomes. Postal services are still of great value, however, despite their exclusion from the TEDI definition of DCS.

Here we wish to make the distinction between a postal service and a remote service. A remote DCS could still meet the defining features by conducting the information exchange remotely, assisted by technology. The logistical challenge for this model relates to submission of substances of concern to the testing facility without the person bringing it themselves. Use of a postal system or sample drop-off points such as community pharmacies or primary healthcare centres, could be combined with a subsequent online or telephone consultation along with dissemination of test results, as part of a remote DCS. Such remote DCS could be more resilient to social or mobility restrictions brought about during pandemic conditions, as well as being more inclusive for service users in rural areas and those with mobility, access or resource restrictions on travelling to a DCS in person.

# Not-quite drug checking

What are some of the less direct interventions that may achieve similar goals to drug checking, which may be used on their own in contexts where drug checking remains blocked by political situations, or used in tandem with drug checking in other contexts?

Services which do not receive, test and disseminate test results directly to service users – and are therefore not DCS – but are nevertheless motivated primarily by harm reduction principles may operate by conducting non publicly accessible testing. Sometimes called ‘back of house’ or ‘halfway house’ testing, samples may be tested from onsite support and emergency services at events, or from amnesty bins or ground finds. Rapid testing and dissemination of results through support services, media, social media, early warning systems and other platforms may have utility (e.g., Pascoe *et al.*, 2022).

The terms ‘front of house’, ‘back of house’ and ‘halfway house’ were applied in this context by Measham (Measham, 2016) to distinguish between the three different types of event-based mobile laboratory testing evolving in the UK in the early 2010s, the sources of their samples, their dissemination strategies and their overall aims. ‘Front of house’ referred to drug checking with samples obtained from and results returned to the public with the primary aim of harm reduction. ‘Back of house’ by contrast referred to drug testing using samples obtained from amnesty bins rather than the public, no results disseminated directly back to individual service users and harm reduction not being the primary aim. ‘Halfway house’ testing was coined to describe The Loop’s emergent model of testing of:

“substances of concern obtained from any on-site services, not just seizures, confiscations or amnesty bin donations. This includes medical, welfare and security incidents, with results circulated to all on-site services. This also allows The Loop to monitor drug trends, identify risky substances in circulation and put out real-time alerts to inform festival goers and the wider public about drugs in circulation.”

More recently, ‘back of house’ and ‘halfway house’ have merged in usage as these event-based testing services have expanded in the UK, with ‘back of house’ increasingly used to refer to any non public testing, which may be for law enforcement, harm reduction or other purposes, located in both mobile laboratories (Johnson, Stansfield and Hassan, 2020, Pascoe *et al.*, 2022) and fixed site laboratories (West *et al.*, 2021, Antonides *et al.*, 2019). Sometimes such non public testing has proved useful, as in the UK, as a stepping stone to full public drug checking, whereby it provides an opportunity to build trust amongst stakeholders and to pilot onsite mobile testing facilities in circumstances of lower demand and less complex service delivery than drug checking demands (Measham, 2016; Measham and Simmons, under review). In other cases, it has proved an invaluable resource for forensic intelligence on local drug markets to inform harm reduction service delivery in jurisdictions where drug checking is not yet possible (West *et al.*, 2021).Another variation from testing substances of concern submitted directly by the public is to test the bodily fluids of PWUD who have required emergency medical treatment. The information collected via self-report from the patient is cross-referenced with the results of blood, urine or hair screening to determine possible unexpected psychoactive substances that may have been ingested. In Australia, the Emerging Drugs Network of Australia toxicosurveillance system has been developed using this model, involving large networks of hospitals paired with toxicology services (Smith *et al.*, 2022). The information has then been fed back into early warning networks and in some cases, resulting in public drug alerts (Victorian Department of Health, 2021).

While the above-mentioned alternative interventions may have clear public-health and harm-reduction value, we argue that the full drug checking service model is more desirable. In comparison to indirect testing services, DCS engage with individual service users about their specific substance of concern, with the specificity of DCS more likely to lead to behavioural change, as well as provide specific and therefore actionable information about the discrepancy between perceived and actual drug composition upon which targeted public alerts can be based.

# Conclusions

Drug checking remains a legally, politically and commercially sensitive health service. As such the definitions of drug checking are themselves contested and reflect the complexities and ongoing challenges of introducing and embedding such services in public health, as well as the wider challenges around acknowledging the value of supporting the efforts of PWUD to make safer choices and reducing the harms they face from consuming unknown substances obtained in unregulated markets.

Reflecting on the history and evolution of drug checking, both as a term and as a harm reduction service, helps provide clarity in terms of what drug checking is and what drug checking isn’t. This facilitates more effective framing of evaluations, in terms of what DCS aim to do and achieve. Creating clear boundaries around drug checking is necessary for the creation of licensing frameworks and associated guidelines for best practice at national and international level, as we move into a new phase of drug checking service delivery with developments in New Zealand and elsewhere. Also, perhaps most significantly, as drug checking is in the process of moving from the margins to the mainstream of drug treatment, with new opportunities for the commissioning and funding of DCS as an innovative intervention in the face of growing drug-related deaths, a clear definition of DCS is necessary to ringfence resources in the face of competing demands and services and to manage the expectations of service users, commissioners and the wider public.

Here we have argued for greater clarity and specificity in what services can be included in the category of DCS, and note the above benefits of such clarity, which we believe outweigh any disadvantages. However, we also acknowledge that there will be some services working under looser definitions that would be unable to comply with specific frameworks, techniques or models, and may then be (unfortunately) excluded from DCS specific funding opportunities as a result. Regardless of the definition of DCS, people who use drugs will do what they can with the tools they have to improve their own and their community’s safety (see Barratt et al. 2022 under review). A more specific definition of DCS does not negate the value of such community-led activities, while still seeking greater resourcing for higher quality services that meet the DCS definition.

# Glossary

DCS - Drug Checking Services

FTIR - Fourier-Transform Infrared Spectroscopy

GC-MS - Gas Chromatography – Mass Spectrometry

HPLC - High Performance Liquid Chromatography

MDMA - 3,4-Methyl​enedioxy​methamphetamine

MOUs - Memoranda Of Understanding

NMR - Nuclear Magnetic Resonance

PS-MS - Paper Spray - Mass Spectrometry

PWUD - People Who Use Drugs

TEDI - Trans European Drug Information

# References

Antonides, L.H., Brignall, R.M., Costello, A., Ellison, J., Firth, S.E., Gilbert, N., Groom, B.J., Hudson, S.J., Hulme, M.C., Marron, J., Pullen, Z.A., Robertson, T.B.R., Schofield, C.J., Williamson, D.C., Kemsley, E.K., Sutcliffe, O.B. and Mewis, R.E. (2019) ‘Rapid Identification of Novel Psychoactive and Other Controlled Substances Using Low-Field 1H NMR Spectroscopy’, *ACS Omega,* 4(4), pp. 7103-7112.

Barratt, M., J., Bright, S.J. and Blackwell, A.R. (Under review) ‘Community-led guerrilla drug checking in response to deaths from adulterated MDMA in Victoria, Australia’, *Drugs, Habits and Social Policy*, *This Issue*

Barratt, M.J., Bruno, R., Ezard, N. and Ritter, A. (2018a) ‘Pill testing or drug checking in Australia: Acceptability of service design features’, *Drug and Alcohol Review,* 37(2), pp. 226-236.

Barratt, M.J., Kowalski, M., Maier, L.J. and Ritter, A. 2018b. Global review of drug checking services operating in 2017. Sydney: National Drug and Alcohol Research Centre, UNSW Sydney.

Borden, S.A., Saatchi, A., Vandergrift, G.W., Palaty, J., Lysyshyn, M. and Gill, C.G. (2022) ‘A new quantitative drug checking technology for harm reduction: Pilot study in Vancouver, Canada using paper spray mass spectrometry’, *Drug and Alcohol Review,* 41(2), pp. 410-418.

Brown, J.K. and Malone, M.H. (1973) ‘Some U.S. Street Drug Identification Programs’, *Journal of the American Pharmaceutical Association (1961),* 13(12), pp. 670-674.

Brunt, T. 2017. Drug-checking/pill-testing as a harm reduction tool for recreational drug users: opportunities and challenges. Lisbon: EMCDDA.

Brunt, T.M., Nagy, C., Bucheli, A., Martins, D., Ugarte, M., Beduwe, C. and Ventura Vilamala, M. (2017) ‘Drug testing in Europe: monitoring results of the Trans European Drug Information (TEDI) project’, *Drug Testing and Analysis,* 9, pp. 188-198.

Davitadze, A., Meylakhs, P., Lakhov, A. and King, E.J. (2020) ‘Harm reduction via online platforms for people who use drugs in Russia: a qualitative analysis of web outreach work’, *Harm Reduction Journal,* 17(1), p. 98.

European Monitoring Centre for Drugs and Drug Addiction 2020. Programming Document 2020–22. Luxembourg: Publications Office of the European Union.

European Monitoring Centre for Drugs and Drug Addiction 2021. Impact of COVID-19 on drug markets, use, harms and drug services in the community and prisons: results from an EMCDDA trendspotter study. Lisbon: EMCDDA.

Gosmer, K. 2018. Drug Checking on Vesterbro. A pilot project at Men’s Home. Mændenes Hjem.

Harper, L., Powell, J. and Pijl, E.M. (2017) ‘An overview of forensic drug testing methods and their suitability for harm reduction point-of-care services’, *Harm Reduction Journal,* 14(1), p. 52.

Johnson, C.S., Stansfield, C.R. and Hassan, V.R. (2020) ‘Festival testing: A survey of suspected drugs seized from New Zealand music festivals, December 2018 to March 2019’, *Forensic Science International,* 313, p. 110367.

Kealy, E.R. and Webber, R. (1975) ‘An Interpretation Of Trends in Street Drug Analysis Programs: Whom Do They Serve?’, *Journal of Psychoactive Drugs,* 7(3), pp. 281-289.

Klatt, E.C., Namiki, T. and Noguchi, T.T. (1986) ‘Misrepresentation of Stimulant Street Drugs: A Decade of Experience in an Analysis Program’, *Journal of Toxicology: Clinical Toxicology,* 24(5), pp. 441-450.

Krausz, R.M., Westenberg, J.N. and Ziafat, K. (2021) ‘The opioid overdose crisis as a global health challenge’, *Curr Opin Psychiatry,* 34(4), pp. 405-412.

Kriener, H., Billeth, R., Gollner, C., Lachout, S., Neubauer, P. and Schmid, R. 2001. On-site pill-testing interventions in the European Union. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.

Laing, M.K., Ti, L., Marmel, A., Tobias, S., Shapiro, A.M., Laing, R., Lysyshyn, M. and Socías, M.E. (2021) ‘An outbreak of novel psychoactive substance benzodiazepines in the unregulated drug supply: Preliminary results from a community drug checking program using point-of-care and confirmatory methods’, *International Journal of Drug Policy*, 93, Article 103169.

Lundberg, G.D., Gupta, R.C. and Montgomery, S. (1974) ‘A Street Drug Identification Program’, *Laboratory Medicine,* 5(4), pp. 8-10.

Maghsoudi, N., McDonald, K., Stefan, C., Beriault, D.R., Mason, K., Barnaby, L., Altenberg, J., MacDonald, R.D., Caldwell, J., Nisenbaum, R., Leece, P., Watson, T.M., Tupper, K.W., Kufner, L., Scheim, A.I., Werb, D. and Drug Checking Services in Toronto Working, G. (2020) ‘Evaluating networked drug checking services in Toronto, Ontario: study protocol and rationale’, *Harm Reduct J,* 17(1), p. 9.

Maghsoudi, N., Tanguay, J., Scarfone, K., Rammohan, I., Ziegler, C., Werb, D. and Scheim, A. (2022) ‘Drug checking services for people who use drugs: A systematic review’, *Addiction,* 117, pp. 532-544.

Marshman, J.A. (ed.) (1974) *Street drug analysis and its social and clinical implications.* end. Toronto, Canada: Addiction Research Foundation of Ontario.

Measham, F. (2016) ‘Drugs, Dissociatives and Displacement: The Festival Drug Report – Part II’, *Volteface*, July 21. Available at: http://volteface.me/features/the-festival-drug-report-part-ii/.

Measham, F. (2020a) ‘City Checking: Piloting the UK’s first community-based drug safety testing (‘drug checking’) service in two city centres’, *British Journal of Clinical Pharmacology,* 86(3), pp. 420-428.

Measham, F. (2020b) ‘The Rise of the NPS Imposters: New Psychoactive Substances, emerging and merging drug markets and the distinct contribution of drug checking’, in Bewley-Taylor, D. and Tinasti, K. (eds.) *Research Handbook on International Drug Policy.* pp. 341-354.

Measham, F. and Simmons, H. (Under review) ‘Who uses drug checking services? Assessing the uptake in English festival drug checking in 2016-2018’, *Drugs, Habits and Social Policy, This Issue.*

Measham, F. and Turnbull, G. (2021) ‘Intentions, actions and outcomes: A follow up survey on harm reduction practices after using an English festival drug checking service’, *Int J Drug Policy,* 95, Article 103270.

Measham, F.C. (2019) ‘Drug safety testing, disposals and dealing in an English field: Exploring the operational and behavioural outcomes of the UK’s first onsite ‘drug checking’ service’, *International Journal of Drug Policy,* 67, pp. 102-107.

Mounteney, J., Griffiths, P., Bo, A., Cunningham, A., Matias, J. and Pirona, A. (2018) ‘Nine reasons why ecstasy is not quite what it used to be’, *International Journal of Drug Policy,* 51, pp. 36-41.

New Zealand Government 2021. Drug and Substance Checking Legislation Bill.

Pascoe, M.J., Radley, S., Simmons, H.T.D. and Measham, F. (2022) ‘The Cathinone Hydra: Increased cathinone and caffeine adulteration in the English MDMA market after Brexit and COVID-19 lockdowns’, *Drug Science, Policy and Law*.

Price, O., Man, N., Bruno, R., Dietze, P., Salom, C., Lenton, S., Grigg, J., Gibbs, D., Wilson, T., Degenhardt, L., Chan, R., Thomas, N. and Peacock, A. (2022) ‘Changes in illicit drug use and markets with the COVID-19 pandemic and associated restrictions: Findings from the Ecstasy and Related Drugs Reporting System, 2016-2020’, *Addiction,* 117, pp. 182-194.

Reed, M.K., Roth, A.M., Tabb, L.P., Groves, A.K. and Lankenau, S.E. (2021) ‘“I probably got a minute”: Perceptions of fentanyl test strip use among people who use stimulants’, *International Journal of Drug Policy, 92*, Article 103147.

Ritter, A. (2019) ‘Making drug policy in summer—drug checking in Australia as providing more heat than light’, *Drug and Alcohol Review,* 39(12-20).

Smith, D.E. (1974) ‘Street drug analysis and community based drug programs’, *Journal of Psychedelic Drugs,* 6(2), pp. 153-159.

Smith, J.L., Soderstrom, J., Dawson, A., Alfred, S., Greene, S., Isoardi, K., McCutcheon, D., Oosthuizen, F., Ezard, N., Burcham, J., Fatovich, D.M. and the EDNA Investigators (2022) ‘The Emerging Drugs Network of Australia: A toxicosurveillance system of illicit and emerging drugs in the emergency department’, *Emergency Medicine Australasia,* 34, pp. 58-64.

Spruit, I.P. (2001) ‘Monitoring synthetic drug markets, trends, and public health’, *Substance Use and Misuse,* 36(1-2), pp. 23-47.

Sutherland, R., Karlsson, A., Price, O., Uporova, J., Chandrasena, U., Swanton, R., Gibbs, D., Bruno, R., Dietze, P., Lenton, S., Salom, C., Grigg, J., Wilson, Y., Eddy, S., Hall, C., Daly, C., Thomas, N., Juckel, J., Degenhardt, L., Farrell, M. and Peacock, A. 2021. Australian Drug Trends 2021: Key Findings from the National Ecstasy and Related Drugs Reporting System (EDRS) Interviews. Sydney: National Drug and Alcohol Research Centre, UNSW Sydney.

Suzuki, J. and El-Haddad, S. (2017) ‘A review: Fentanyl and non-pharmaceutical fentanyls’, *Drug and Alcohol Dependence,* 171, pp. 107-116.

Trans European Drug Information (TEDI) 2022. TEDI Guidelines. Drug Checking Methodology.

Ventura, M., Noijen, J., Bücheli, A., Isvy, A., van Huyck, C., Martins, D., Nagy, C., Schipper, V., Ugarte, M. and Valente, H. 2013. Drug Checking Service Good Practice Standards. Nightlife Empowerment & Well-Being Implementation Project. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.

Victorian Department of Health. (2021) *25B-NBOH sold as powdered ‘LSD’ (July 2021)*. Available at: https://www.health.vic.gov.au/drug-alerts/25b-nboh-sold-as-powdered-lsd-july-2021.

Vidal-Giné, C., Fornís-Espinosa, I. and Ventura-Vilamala, M. (2014) ‘New psychoactive substances as adulterants of controlled drugs. A worrying phenomenon?’, *Drug Testing and Analysis,* 6(7-8), pp. 819-824.

Wallace, B., Hills, R., Rothwell, J., Kumar, D., Garber, I., van Roode, T., Larnder, A., Pagan, F., Aasen, J., Weatherston, J., Gozdzialski, L., Ramsay, M., Burek, P., Azam, M.S., Pauly, B., Storey, M.-A. and Hore, D. (2021) ‘Implementing an integrated multi-technology platform for drug checking: Social, scientific, and technological considerations’, *Drug Testing and Analysis,* 13(4), pp. 734-746.

West, H., Fitzgerald, J., Hopkins, K., Li, E., Clark, N., Tzanetis, S., Greene, S. and Reid, G. (2021) ‘Early warning system for illicit drug use at large public events: Trace residue analysis of discarded drug packaging samples’, *Journal of the American Society for Mass Spectrometry,* 32(10), pp. 2604–2614.